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WHAT IS CLAIMED IS:

1. A tubular wire support for combination with a sheath to produce a bifurcated endoluminal prosthesis, said tubular wire support comprising:

5 a main body support structure having a proximal end, a distal end and a central lumen extending therethrough, the support structure comprising at least a first and second axially adjacent tubular segments, each segment comprising a plurality of wall struts connected by proximal and distal bends;

a first branch support structure having a proximal end, a distal end and a central lumen therethrough connected to the main body support structure;

10 a second branch support structure having a proximal end, a distal end and a central lumen extending therethrough, connected to the main body support structure;

at least two sliding links in between the first and second segments; and  
at least one lock on a wall strut for limiting axial movement of a sliding  
15 link along that strut.

2. The tubular wire support of Claim 1, wherein the main body support structure and the first and second branch support structures are self-expandable from a radially collapsed state to a radially expanded state.

20 3. A tubular wire support as in Claim 2, wherein at least a portion of the tubular wire support has an expansion ratio of at least about 1:4.

4. The tubular wire support of Claim 1, further comprising a tubular sheath on the wire support.

5. The tubular wire support of Claim 4, wherein the sheath comprises a PTFE sleeve surrounding at least a central portion of the wire support.

25 6. The tubular wire support of Claim 1, wherein each segment comprises wire formed into a series of proximal bends, a series of distal bends, and a series of struts connecting the proximal and distal bends.

7. The tubular wire support of Claim 6, wherein each tubular segment comprises from about 4 proximal bends to about 12 proximal bends.

30 8. The tubular wire support of Claim 1, wherein the first and second branch support structures are pivotably attached to the main body support structure.

9. A flexible self expandable graft, comprising:

a tubular main body support structure having a proximal end and a distal end, the tubular body comprising at least a first tubular segment attached to a second tubular segment; and

a tubular polymeric sleeve surrounding at least a portion of the graft;

5                    wherein each of the first and second tubular segments comprise a plurality of proximal bends and distal bends connected by struts surrounding a longitudinal axis such that a first strut is on a first side of the axis and a second strut is on a second side of the axis, opposite to the first side, and in at least one segment the first strut is shorter than the second strut.

10                  10.      A flexible self expandable graft as in Claim 9, further comprising at least a first and second sliding link between the first and second tubular segments.

11.      A flexible self expandable graft as in Claim 10, wherein the first and second sliding links join opposing proximal and distal bends on the first tubular segment and the second tubular segment.

15                  12.      A flexible self expandable graft as in Claim 11, comprising at least four sliding links between the first and second segments.

13.      A flexible self expandable graft as in Claim 9, comprising at least four segments.

20                  14.      A flexible self expandable graft as in Claim 11, comprising a series of struts connecting the proximal bends and distal bends within a segment to form a tubular segment wall, wherein at least some of the struts are substantially linear.

15.      A flexible self expandable graft as in Claim 14, wherein the sliding link comprises a proximal bend or distal bend on a first segment slidably engaged with a strut on an adjacent segment.

25                  16.      A flexible self expandable graft as in Claim 11, wherein each segment comprises from about 4 proximal bends to about 12 proximal bends.

17.      A flexible self expandable graft as in Claim 11, having at least a proximal segment, an intermediate segment and a distal segment, wherein the prosthesis is expandable from a reduced cross section to an expanded cross section.

30                  18.      A flexible self expandable graft as in Claim 17, wherein at least a portion of the proximal segment is larger in cross section than the central segment when the prosthesis is in the expanded cross section.

19. A flexible self expandable graft as in Claim 11, wherein the sleeve comprises a tubular PTFE sleeve surrounding at least a portion of the prosthesis.

20. An endoluminal prosthesis, comprising at least one elongate flexible wire, formed into a plurality of axially adjacent tubular segments spaced along an axis,  
5 each tubular segment comprising a zig-zag section of wire, having a plurality of proximal bends and distal bends, at least one of the plurality of proximal bends and plurality of distal bends having loops thereon, and a tubular polymeric sleeve carried by the prosthesis, wherein the prosthesis is radially compressible into a first, reduced cross sectional configuration for implantation into a body lumen, and self expandable to a  
10 second, enlarged cross sectional configuration at a treatment site in a body lumen, and wherein at least a first portion of wire in one tubular segment is positioned on a radially outwardly facing surface of the sleeve and a radially inwardly facing surface of the sleeve is in contact with a second portion of wire.

21. An endoluminal prosthesis as in Claim 20, comprising at least three  
15 segments formed from said wire.

22. An endoluminal prosthesis as in Claim 20, wherein the prosthesis has a proximal end and a distal end, and at least one of the proximal end and distal end are expandable to a larger diameter than a central section of the prosthesis in an unconstrained expansion.

20 23. An endoluminal prosthesis as in Claim 20, wherein the prosthesis has an expansion ratio of at least about 1:4.

24. An endoluminal prosthesis as in Claim 23, wherein the prosthesis has an expansion ratio of at least about 1:5.

25 25. An endoluminal prosthesis as in Claim 20, wherein the prosthesis has an expanded diameter of at least about 20 mm in an unconstrained expansion, and the prosthesis is implantable using a catheter no greater than about 20 French.

26. A prosthesis as in Claim 25, wherein the prosthesis has an expanded diameter of at least about 25 mm, and is implantable on a delivery device having a diameter of no more than about 20 French.

30 27. An endoluminal prosthesis as in Claim 20, comprising at least six proximal bends on a distal segment, wherein at least three of the proximal bends reside

on the outside of the tubular sleeve and the remainder of the proximal bends on the distal segment are positioned on the inside of the tubular sleeve.

28. An endoluminal prosthesis as in Claim 27, wherein the proximal bends on the inside of the tubular sleeve are connected to distal bends on a proximal segment.

5           29. A tubular wire support for a bifurcated endoluminal prosthesis, said wire support comprising:

          a main body support structure having a proximal end, a distal end and a central lumen extending along a longitudinal axis therethrough;

10           a first branch support structure having a proximal end, a distal end and a central lumen therethrough, wherein the distal end of the first branch support structure is connected to the proximal end of the main body support structure;

          a second branch support structure having a proximal end, a distal end and a central lumen extending therethrough wherein the distal end of the second branch support structure is connected to the proximal end of the main body support structure, and

15           a plurality of radially outwardly extending barbs on the main body, integrally formed on the wire support;

          wherein the main body support structure and the first and second branch support structure are self-expandable from a radially collapsed state to a radially expanded state.

20           30. The tubular wire support of Claim 29, further comprising a tubular sheath on the wire support.

          31. The tubular wire support of Claim 30, wherein the sheath comprises a PTFE sleeve surrounding at least a central portion of the wire support.

25           32. The tubular wire support of Claim 29, wherein the wire in each support structure is formed into a plurality of segments, each segment comprising a series of proximal bends, a series of distal bends, and a series of struts connecting the proximal and distal bends.

30           33. The tubular wire support of Claim 32 wherein each tubular segment comprises from about 4 proximal bends to about 12 proximal bends.